

Name _____

STUDY GUIDE for Midterm

Ch 1 Introduction: Experimental Design and Characteristics of Living Things

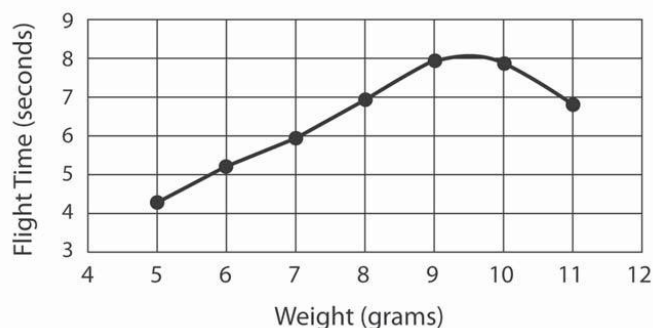
1. A good experiment should have:

- A testable _____ (possible answer to a scientifically testable question)
- Detailed qualitative and/or quantitative _____
- An experimental group and a _____ group
- How many variables being changed at one time? _____

2. Label each of the following as an “inference,” a “qualitative observation”, or a “quantitative observation.”

- The plant has pink flowers. _____
- The plant is 12 inches tall. _____
- The plant is healthy because it was given sunlight and water. _____

Use the following graph, which shows the effect of weight on the flight time of a paper airplane, to answer questions #3.



3. The independent variable is _____ while the dependent variable is _____.

4. What are the 8 criteria that all living things must meet?

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.

5. Give 3 examples of how organisms maintain homeostasis.

- 1.
- 2.
- 3.

Ch 2: Chemistry of Life

6. _____ is the attraction between molecules of different substances.
_____ is the attraction between molecules of the same substance.
_____ is the amount of heat energy required to increase temperature.
7. Carbon can form _____ covalent bonds. Monomers are joined to form polymers by _____, which forms bonds through the _____ of water. Polymers can be split back into monomers by _____, where bonds are broken through the _____ of water.
8. Name the monomers that make up each of the following polymers:
- Nucleic acids _____
 - Proteins _____
 - Carbohydrates _____
 - Lipids _____
9. Glucose, fructose, and galactose are examples of _____. Sucrose is an example of a/an _____. Glycogen, plant starch, and cellulose are examples of _____. Note: All of these are **carbohydrates**.
10. **Lipids** are not _____ soluble. _____, waxes, and _____ store energy, pad and insulate the body, and form waterproof coverings. _____ make up cell membranes. _____ are hormones that act as chemical messengers.
11. Two examples of **nucleic acids** are _____ and _____. Nucleotides consist of a 5-carbon _____, a _____ group, and _____ bases.
12. Explain at least one function of each of the following macromolecules.
- Carbohydrates
 - Lipids
 - Nucleic Acids
 - Proteins
13. Enzymes are proteins that act as _____ by speeding up chemical reactions in cells without being permanently changed. They do so by lowering the reaction's _____ energy. The shape of an enzyme is very important, because certain enzymes can only catalyze certain _____.

Ch 7: Cell Structure and Function

14. Name 4 structures that are found in ALL cells.

-
-
-
-

15. Unicellular organisms like bacteria that lack a **nucleus** are called _____.
Protists, fungi, plants, and animals are considered _____ because their DNA is enclosed within a **nucleus**.

16. The control center of the cell is the _____. _____ contain digestive enzymes that clean up the cell and are typically found only in _____ cells.

17. Proteins are produced at the _____. The internal membrane system that transports lipids and proteins is called the _____. The _____ modifies, sorts, and packages proteins and lipids.

18. Chemical energy from food is converted into ATP during respiration in the _____. Energy from sunlight is converted into chemical energy (glucose) in the _____. These photosynthetic organelles are found only in _____.

19. The _____ supports, shapes and protects prokaryotic and plant cells (but is not found in animal cells). The selectively permeable barrier that regulates what enters and leaves ALL cells is the _____.

20. Diffusion, which is an example of _____ transport, is the movement of a solute from _____ to _____ concentration and therefore does NOT require _____. Active transport moves materials from _____ to _____ concentration and therefore DOES require _____.

Ch 8 and 9: Photosynthesis and Respiration

21. Living organisms primarily use _____ to store and release energy. _____ occurs in plants, algae, and some bacteria, but _____ occurs in nearly all living organisms.

22. Photosynthesis converts _____ energy to _____ energy. The reactants of this energy transforming reaction include _____, _____, and _____ while the products include _____ and _____.

23. The principle pigment in plants used to absorb light for photosynthesis is _____. It absorbs _____ and _____ colored light well but _____ green light, giving plants their green color.

24. _____ releases energy from food in the presence of oxygen. The reactants of this energy transforming reaction include _____ and _____ while the products include _____, _____, and _____.

25. Glycolysis is considered an _____ process because it does NOT require oxygen. However, in the electron transport chain of cellular respiration, _____ is essential to produce large amounts of _____.

26. If oxygen is NOT present, cells can release energy through _____ following glycolysis. It occurs in the _____ of the cell. The products of alcoholic fermentation are _____ and _____. Carbon dioxide is NOT given off in _____ fermentation, as pyruvic acid is converted to lactic acid.

27. In which organelle does each of the following energy conversions primarily occur?

- Photosynthesis _____
- Cellular respiration _____

28. Explain at least three similarities and three differences between photosynthesis and cellular respiration.

Similarity

-
-
-

Differences

-
-
-

Ch 10: Cell Growth and Division

29. _____ is programmed cell death, _____ forms sex cells for reproduction, and _____ forms new body cells for growth and tissue repair.

30. _____ is the division of the cytoplasm, _____ is the division of the nucleus, and _____ occurs between cell divisions. The chromosomes are copied during the ____ phase of interphase.

31. The first and longest phase of mitosis is _____. The second and shortest phase of mitosis is _____. The third phase of mitosis is _____, and the last phase of mitosis is _____.

32. The nuclear envelope breaks down during _____ and reforms during _____ (at this point there is one at each end). The spindle disassembles during _____ and the centrioles appear and the spindle assembles during _____.

33. Chromatids separate and move apart toward the centrioles at each end of the cell during _____. DNA coils tightly and individual chromosomes first become visible during _____. Chromosomes line up across the middle of the cell during _____.

34. During Prophase I, homologous chromosomes exchange parts of their non-sister chromatids during a process called _____. The random alignment of homologs during Metaphase I is called _____. These processes increase genetic diversity!

35. Which of the following are produced at the end of Meiosis II?
(circle the correct choice in EACH row)

- 2 or 4 cells
- Identical or nonidentical cells
- Haploid or diploid cells

36. Explain 5 specific differences between mitosis and meiosis

Mitosis

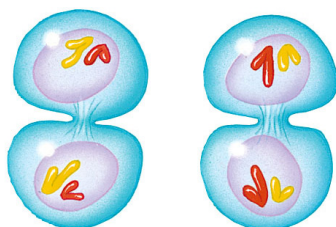
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Meiosis

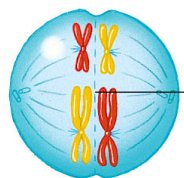
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For questions 37-40, label each cell with correct phase of meiosis. Be sure to include I or II for each.

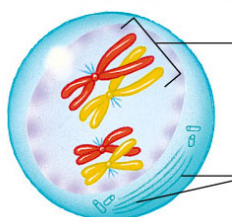
37. _____



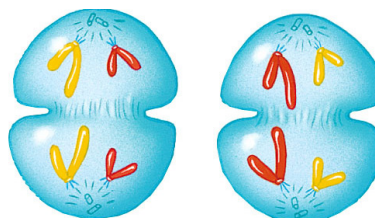
38. _____



39. _____



40. _____



Ch 11: Genetics

41. _____ individuals have 2 different alleles of a gene while _____ individuals have 2 identical alleles of a gene. The allele combination in an individual that causes particular traits or disorders is called its _____ and the expression of a gene in traits or symptoms is its _____.

42. A monohybrid cross results in a phenotypic ratio of _____ while a dihybrid cross results in a phenotypic ratio of _____.

43. Inheritance in which both alleles are fully expressed is called _____. Inheritance where neither allele is dominant, resulting in a “blending” of alleles, is called _____. Inheritance in which a gene has more than 2 **alleles** is classified as having _____. A trait controlled by 2 or more **genes** is considered _____.

44. Black coat color (B) in guinea pigs is dominant over white coat color (b).
Cross two heterozygous black guinea pigs.

♂ _____ X _____ ♀

GENOTYPE RATIO: _____

PHENOTYPE RATIO: _____

Probability offspring has genotype BB: _____

Probability offspring has genotype Bb: _____

Probability offspring has genotype bb: _____

Probability offspring has black fur: _____

Probability offspring has white fur: _____

45. In mice, running (R) is dominant over waltzing (r), and black hair (B) is dominant over brown (b).
Cross a heterozygous running, brown mouse with a heterozygous running, homozygous black mouse

♂ _____ x _____ ♀

Phenotypic ratio:

Probability offspring is
running AND black: _____

waltzing AND black: _____

46. In four o'clock flowers, red (R) is **incompletely dominant** over white (W). What cross would result in a phenotypic ratio of 1 red: 2 pink: 1 white? Determine the genotypes AND phenotypes of the parents.

Show a Punnett square to support your answer.

Genotypes of parents _____ x _____

Phenotypes of parents _____ x _____

47. In chickens, black feathers (BB) are **codominant** with white feathers (WW).

The heterozygous genotype (BW) results in erminette, or speckled black AND white feathers.

What cross would result offspring that are all erminette? Determine the genotypes AND phenotypes of the parents. Show a Punnett square to support your answer.

Genotypes of parents _____ x _____

Phenotypes of parents _____ x _____

48. Human blood types are an example of **multiple alleles** that also display **codominance**.

Cross a male with type O blood with a female with type AB blood. Complete the following.

♂ _____ x ♀ _____

What is the probability they would have a child with the following blood types:

A _____

B _____

AB _____

O _____

49. Colorblindness is a **recessive sex-linked** condition.

Using (N) for normal vision and (n) for colorblind,

cross a normal male with a heterozygous normal female. ♂ _____ X _____ ♀

Probability of having a child who is:

Normal _____

Colorblind _____

Probability a male offspring would be:

Normal _____

Colorblind _____

Probability a female offspring would be:

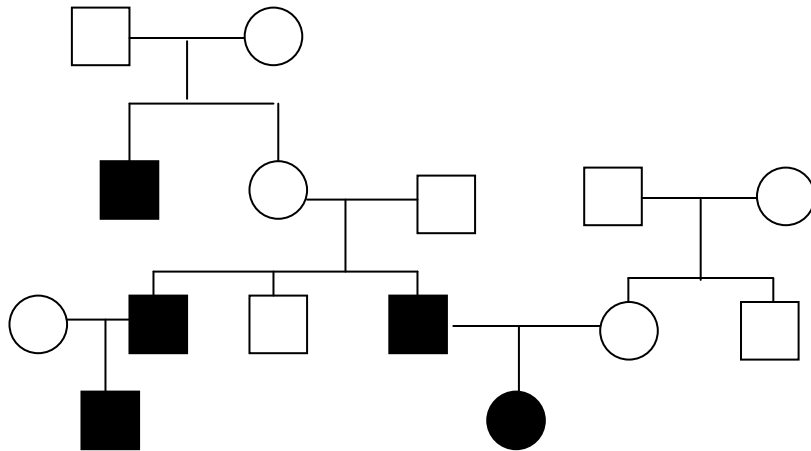
Normal _____

Colorblind _____

Genotypic ratio:

Phenotypic ratio:

50. Below is a pedigree tracing the inheritance of colorblindness, a **recessive sex-linked** trait. Using N or normal and n for colorblind, give the correct genotype for the individuals listed.



A _____

B _____

C _____

D _____

E _____

F _____

G _____

H _____

I _____

J _____

K _____

L _____

M _____

N _____

O _____